

**Testimony Before US House Committee on Agriculture Subcommittee
on Conservation, Credit, Rural Development and Research
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Good Morning Mr. Chairman and members of the subcommittee. I am Pete Siggelko, vice president of Plant Genetics and Biotechnology at Dow AgroSciences. Thank you for this opportunity to testify before this subcommittee of the US House Committee on Agriculture. I would first like to thank you for holding this hearing because, as you'll hear, we have a lot of positive things to share with you today. I'd also like to thank this committee for its long-term support of agricultural biotechnology and for ensuring that we have the most productive growers and the world's cheapest, safest, and most abundant food supply.

With an increase in consumer confidence and the development of a science based regulatory system that has served as a model for the rest of the world, Dow AgroSciences and my fellow colleagues within the life sciences and technology sector have been able to bring innovative products to market and to invest in novel, exciting breakthrough products for the future. Moreover, through open communication and collaboration with the value chain, we have enjoyed unprecedented support by U.S. growers and food chain customers. On behalf of Dow AgroSciences and The Dow Chemical Company, it is my privilege to discuss with this esteemed committee the current status of agricultural biotechnology and our current and future product development efforts. My written comments have been submitted to the record in their entirety.

Dow AgroSciences LLC based in Indianapolis, Indiana, USA, is a global leader in providing pest management and biotechnology products that improve the quality and quantity of the earth's food supply and contribute to the health and quality of life of the world's growing population. Dow AgroSciences has approximately 5,700 people in more than 50 countries dedicated to its business, and has worldwide sales of US \$3 billion. Dow AgroSciences is a wholly owned indirect subsidiary of The Dow Chemical Company. With annual sales of \$33 billion, The Dow Chemical Company has over 40,000 employees globally and serves customers in more than 180 countries and a wide range of markets that are vital to human progress, including food, transportation, health and medicine, personal and home care, and building and construction, among others.

The initial phase of agricultural biotechnology brought us products for disease and insect protection. These products filled a very important niche for modern farmers by bolstering their Integrated Pest Management, or IPM, programs. To both large and small farming operations, biotechnology has resulted in increased yields and reduced costs. This technology will also continue to deliver traits, such as drought tolerance, that can revitalize agricultural economies in areas where the land has been non-productive for years. As global populations increase exponentially over the coming decade, it will be imperative that agriculture keep up with the resulting burgeoning demand. As recently

noted by Mr. Diouf, Director General of the UN Food and Agriculture Organization, food production will need to increase 60 percent by 2050 and "...will require intensified cultivation, higher yields and greater productivity. We will have to use the scientific tools of molecular biology, in particular the identification of molecular markers, genetic mapping and gene transfer for more effective plant enhancement, going beyond phenotype-based methods."

In a relatively short period of time, biotechnology has made significant contributions to the enhanced production of key commodities such as corn, soybeans, cotton and canola. Today, these crops are planted on more than 145 million acres worldwide with the United States representing more than two-thirds of all biotechnology crops planted globally. The adoption of bioengineered plants has been the most rapid in the United States where there has been a 20-fold increase in the area of biotechnology crops over the last seven years. We expect this adoption trend to continue globally over the coming years.

Biotechnology also offers the ability to improve the quality and enhance the nutritional content of various foods. New varieties of soybeans and canola, for example, that have healthier fat content profiles are now practical and, in some cases, already available to the consumer. In the non-foods area, we see markets opening for genetically engineered renewable fuels and lubricants derived from biomass that could slash the dependency on petroleum products. Manufacturing antibodies, industrial products and pharmaceuticals in plants is no longer a pipe dream; it is a reality. Through the continuing support of the U.S. Congress and the members of this committee and subcommittee, the industry has been able to realize some of the real benefits of biotechnology with more innovative products and solutions to come. As industry has said all along, biotechnology is a tool that will enable innovation and the introduction of products with transparent consumer benefits if we can maintain consumer confidence and nurture an environment that allows for our freedom to operate. Largely, the United States has successfully achieved both objectives.

The Dow Chemical Company (Dow) is part of this agricultural biotechnology revolution. A number of Dow's biotech platforms touch agriculture—Dow AgroSciences' Plant Genetics and Biotechnology platform and Dow's Industrial and Bio-based Materials platforms. I would now like to turn my attention to some of the specific and exciting biotechnology innovations we are working on within Dow.

Dow AgroSciences has recently introduced its second *Bt* product, Herculex™ I insect resistant corn, in the United States. We also have two exciting insect traits for corn in the pipeline, including a novel rootworm product that is nearing final regulatory approval, and a *Bt* cotton product, Widestrike*, that will be introduced through Phytogen, our cotton seed joint venture, in 2005.

It had been said that the next wave of biotechnology would involve the genetic modification of crops tailored to specific consumers, whether for food, feed, fiber, fuel, lubricants, soap and other characteristics, perhaps even pharmaceutical and plastic components. Today, many of these products are here. We are developing second

generation products that truly offer unique benefits to the consumer and end-users. Using the tools of biotechnology and improved agricultural practices, Dow AgroSciences has been able to develop and commercialize a novel product called Natreon™ canola oil that can reduce the amount of saturated and trans fat in food products today. Recent research shows that trans fats can be even more harmful to health than saturated fats. It is estimated that trans fat could be causing more than 20,000 deaths in the United States each year. Research shows a strong link between diet choices and obesity, and chronic diseases such as cardiovascular disease and Type 2 diabetes. By replacing partially hydrogenated oils with Natreon canola oil, the amount of saturated and trans fat could be reduced by as much as 85 percent in a typical cracker, directly benefiting American consumers. Natreon is a readily available and practical alternative to partially hydrogenated oil for food service and manufacturers who are looking to simultaneously decrease trans and saturated fats in their products today. This product can provide consumer benefits now by being part of the solution to the complex problem of obesity and the resulting chronic diseases.

The canola industry is rapidly expanding production of canola and Natreon. In order to meet consumer demand Dow AgroSciences hopes to expand this opportunity to canola producers in many of the states represented by members of this committee such as Oklahoma, Kansas, Georgia, Minnesota and many more.

Dow is also using plant and plant cell systems to ‘manufacture’ novel therapeutics and biologics for both animal and human health. The benefits of a plant-based manufacturing system are great, and the resulting products have the potential to alter how diseases are treated in the future. Plant-made biologics contain no materials of animal origin, mitigating the chance of contamination with extraneous disease agents during use; work without risks of adverse effects associated with most current vaccines; and are very stable requiring no refrigeration and offering needle-free delivery. This is truly revolutionizing how we administer animal vaccines.

Dow AgroSciences is rapidly carving a space in the Animal Health market segment, a well-established, regulated global industry with current sales of approximately \$12B. Today, biologics (vaccines and antibodies) account for \$2.8B and are the fastest growing segment of this industry. Currently, Dow AgroSciences is building a biosecurity facility in Nebraska to develop animal therapeutics and is on track to launch the world’s first biocontained, plant-made animal health vaccine by 2006. Several other plant-made vaccines, including an Avian Influenza vaccine, are in varying stages of research, with projected launches beginning in 2007. Dow AgroSciences also has scientific collaborations with a number of world-class institutions and governmental entities including USDA.

Closely related in terms of benefits to industry and consumers are our company’s activities in the area of food safety. Food safety is a high profile, high consumer concern with a significant impact on the US and global economy. The Centers for Disease Control estimates there are 76 million cases of food-borne illness and 5,000 deaths per year. The top six food safety pathogens cost the U.S. economy between \$6B and \$34B per year

(USDA-ERS estimate). One of the targets Dow is currently developing is an antibody for *E. Coli* 0157:H7 to be administered orally to cattle prior to slaughter. These efforts will complement the existing Hazard Analysis and Critical Control Point (HACCP) food safety program adopted by the Food and Drug Administration (FDA) and the USDA, further enhancing the security and safety of the food supply.

Similarly, we are exploring the use of plant systems to develop human therapeutics. For example, Dow's Plant Biopharmaceuticals platform comprises a full spectrum of approaches, including not only whole plants for open field production, but also other plant-based and viral vector technologies, with production in greenhouses and growth chambers. Open field acreage devoted to pharmaceutical host plants is extremely small - approximately 100 acres in the United States in 2003 - and likely to remain so. Industry experts estimate that, even if the technology reaches a high level of success, acreage for all types of plant hosts will amount to no more than 8,000-12,000 acres annually at maturity. Dow recognizes that rigorous corporate stewardship and strong government regulations are necessary for the long-term success of this platform.

Industrial Biotechnology: Use of renewable agricultural resources in biotechnology processes

Three years ago, the Organization for Economic Cooperation and Development (OECD) published a report examining 21 biotechnology case studies. The report painted a compelling picture of the possibilities inherent in biotechnology to lead to improved consumer products, more efficient industrial processes leading to reduced costs and improved productivity, and a significantly reduced environmental footprint. Just weeks ago, Biotechnology Industry Organization (BIO), the industry organization representing more than 1,000 biotechnology companies, academic institutions, state biotechnology centers and related organizations from around the world, released a new report, building upon those 21 case studies and asked the question, 'What if the benefits of these 21 case studies were extrapolated to broad industrial sectors?' The answer? A vibrant picture of economic revitalization and environmental renewal.

Today, renewable agricultural resources are increasingly being employed as a feedstock for the subsequent development of industrial materials. Dow is helping with this transformation of U.S. agriculture. Currently, Dow's biotechnology and bio-materials platforms are utilizing corn, soybean, wheat, castor sunflower, and a variety of oilseeds to develop novel biomaterials such as plastics, high performance polyurethane carpet backing, fiberboard, and epoxy coatings to name a few. Some are still "lab bench" projects, several years from the market while others are actually commercialized today.

Substituting raw materials based on plant-derived oils for those based on fossil fuels can lead to important benefits including a significant reduction in greenhouse gas emissions while providing alternative opportunities for commodity agriculture. For example, NatureWorks™ PLA currently being produced by Cargill Dow at its Blair, Nebraska, site significantly reduces fossil fuel consumption by up to 50 percent, and generates 15 to 60 percent less greenhouse gases (GHG) than the material it replaces.

Public private partnerships also remain an important part of the equation and are essential to fueling many of these new opportunities. The Oilseed Engineering Alliance represents such an effort. This initiative joins scientists from Dow and the public sector, under a U.S. Department of Energy grant, to develop options for using agricultural crops as raw materials to produce plastics, chemicals, and other industrial products. Also, the consortium is working to improve traits of specific oils and fatty acids in soybeans, canola, sunflower and other crops to help deliver new solutions in nutrition, health care and material science.

Concluding Remarks: The future of agricultural biotechnology and allied opportunities

In closing, we have a few final thoughts and recommendations for the Committee's consideration. We hope the U.S. Government continues to be a staunch and aggressive advocate of these new technologies on a national and international front. Through our government agencies and the U.S. Congress, we need to continue to dismantle any non-scientifically-based trade barriers that would seek to restrict trade of commodities produced through biotechnology and promote trade agreements that guarantee the free and open trade of our agricultural products, whether produced through traditional or newer methods. To date, much of our success is attributed to your unwavering support and the administration's efforts to bolster the regulatory framework governing biotechnology.

The government has an important, continuing role in assuring the development, commercialization and adoption of biotechnology and renewable resource-based materials. Government agency research agreements, contracts, grants, and funding for collaborations are enabling and encouraging development of key technologies throughout industry. There is still much scientific discovery to be done to fully benefit from a bio-based economy grounded in agriculture. Basic research must continue to be funded by the federal government. It is equally important the government help remove the barriers and obstacles to commercialization that exist in the nascent industrial biotech industry through efforts such as the USDA's Bio-Based Purchasing Rules. Government procurement can help give fledgling products a chance to overcome the significant conversion hurdles often encountered in the market. What is critical is that these efforts allow bio-based products to compete fairly and equitably with incumbent materials.

As is the case with industrial biotechnology, the government has an important role to play in nurturing research in plant made pharmaceuticals. Support, in the form of programs such as a cooperative research agreement Dow has entered into with the National Institutes of Health (NIH) to seek rapid vaccine production systems, will help not only nurture an evolving industry but also play a critical role in important matters of national policy, ranging from affordable and accessible health care to Homeland Security. This benefits us all. The government must also play a role in ensuring a fair and balanced regulatory system that allows for a viable plant biopharmaceuticals industry and ensures the continued safety of our food supply.

Lastly, Dow and the biotechnology industry have been able to bring technological innovations to the market because we have enjoyed a certain freedom to operate while being governed by a pragmatic science based regulatory system. Sites such as Hawaii and Puerto Rico serve as the 'lifeline' for our research and development efforts due to their favorable year-round climates, fertile environment, and rich academic and public resources. It is incumbent upon all of us to continue to reach out to these geographies to ensure full understanding amongst all stakeholders and to facilitate cooperative relationships between constituents, the local community, local institutions, industry and government. Today we are facing real threats to our freedom to operate in these areas and we need continued support from this body.

In closing, we have made significant progress since the initial debut of biotechnology less than one decade ago and are clearly in the midst of a biotechnology boon within agriculture. Not only are products being introduced and adopted by the American farmer at a steadily increasing rate, but Dow has been able to use tools of biotechnology to start bringing forward a suite of new and exciting products with greater tangible consumer benefits. Thanks to this body for its continued support and oversight of this technology. This has greatly contributed to our success as an industry, enabled us to expedite introduction of new tools for U.S. farmers, and is now helping us realize some of the cutting edge technological breakthroughs we have long been discussing,

Thank you. Mr. Chairman. I'd be glad to take any questions that you or your colleagues have at this time.

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Attachment 1: Speaker Biography



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Pete Siggelko is Global Leader, Plant Genetics and Biotechnology. Prior to this role, Siggelko was Global Leader of Weed Management as well as responsible for the company's Pacific Business Units.

Through his career, Siggelko has served the company in a variety of roles and locations. He has been General Manager for Latin America, Global Business Operations Manager for Insecticides and Fumigants and U.S. Western Regional Sales Manager. In addition, he was Product Marketing Manager for Lorsban* insecticides and was a sales and marketing trainer. Siggelko began his career as a sales representative in Northern California and Nevada.

Siggelko received his Bachelor's Degree in Industrial Management from the Georgia Institute of Technology.

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